CJC:70002

FIXED SELF-TEST PRISM
AND IMPROVED TELESCOPE SEAL

1. This proposal is submitted in response to the request for a positive mounted self-test mirror. The proposal design will eliminate the moveable self-test mirror arm, mirror and solenoid, and replace them with a fixed prism. The prism is mounted in a bracket which is attached to the telescope housing directly beneath the self-test lights assembly. The self-test lights illuminate the prism which directs the beam on to the detector elements and provides sufficient illumination for self-test operation.

2. As a result of removing the self-test arm and solenoid, the openings in each side of the telescope used to mount the self-test arm will be sealed. during the modification, other points at which the telescope may leak will be determined and the best possible seal effected in order to protect the detectors from moisture.

3. Installation can commence concurrent with the field of view modification. It is estimated that two units per week can be completed when systems are available. Since this modification requires disassembly of the telescope and system recalibration, it should be performed in conjunction with the field of view modification

CJC:70002

COST BREAKDOWN

Material

Purchased Parts		$3,000		
Raw Material		200		
Total Materials			$3,200	
Material Burden @ 11%			352	
Total Material Including Burden				$ 3,552
	Hours	Rate/Hour $	Amount $	
R&D POOL (Engineering)				
Salaried	179	7.37	1,319	
Hourly	172	4.55	783	
Total R&D Direct Labor				2,102
Direct Labor Overhead @ 135%				2,838
Total Direct Costs Including Overhead				8,492
General and Administrative Expense @ 14.8%				1,257
Total Estimated Cost				9,749
Fixed Fee				800
Total Estimated Cost Including Fixed Fee				$10,549

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CJC:70003

PROPOSED INCREASED FIELD OF VIEW

1. It is proposed that the present system field of view be increased in azimuth coverage from $\pm 37^\circ 38'$ to $\pm 43^\circ 50'$. The field can be increased by a modification of the telescope mirror assembly, P/N 1277899, and a slight re-alignment of bar positions. For a complete technical discussion, see study report enclosure (1).

By extending the telescope reflecting mirror 0.578" down the telescope axis, and tilting the mirror to an angle of $53^\circ 15'$ with respect to the axis, the system azimuth look angle becomes greater than the azimuth mechanical angle according to the equation -

$$\theta_{LA} = \theta_{MA} + \alpha \sin \theta_{MA}$$

where θ_{LA} is the azimuth look angle,

θ_{MA} is the azimuth mechanical angle and

α is the angle that the telescope reflecting mirror is offset in front of the verticle axis of the scanning mirror.

Design equations have been verified by laboratory experiment to prove the feasibility of the proposed modification. α was maximized at $5^\circ 30'$ to provide $0^\circ 18'$ of double row overlap between bars. Since the overlap between bars is essentially reduced to 2 detector pairs instead of the present 13 pairs, the overlap inhibit function which prevents one target from appearing as two when it is located in the overlap region will be modified.

Proposed Increased Field of View (cont)

2. To accomplish the increased field of view, the following modifications are necessary.

(a.) Install new mirror mount assembly.

(b.) Install new azimuth index plate.

(c.) Install new dome mask.

(d.) Remove diode on System 401 and 402 card to modify overlap inhibit function.

(e.) Re-align bar positions and re-calibrate system.

(f.) Make necessary documentation changes.

CJC:70003

COST BREAKDOWN

Material				
Purchased Parts		$6,000		
Raw Material		1,292		
Total Materials			$7,292	
Material Burden @ 11%			802	
Total Material Including Burden				$ 8,094
	Hours	Rate/Hour $	Amount $	
R&D POOL (Engineering)				
Salaried	2,229	7.37	16,428	
Hourly	2,755	4.55	12,535	
Total R&D Direct Labor				28,963
Direct Labor Overhead @ 135%				39,100
Total Direct Costs Including Overhead				76,157
General and Administrative Expense @ 14.8%				11,271
Total Estimated Cost				87,428
Fixed Fee				7,000
Total Estimated Cost Including Fixed Fee				$94,428

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INCREASED FIELD OF VIEW STUDY

5 January 1970

I. SUMMARY

A study was conducted to determine the feasibility of increasing the system azimuth field of view to $+45^{\circ}$. Design studies and lab experiments demonstrated that the field of view can be extended from the present $\pm 36^{\circ}42'$ of double row scan to $\pm 42^{\circ}59'$, with single row scan extending to $43^{\circ}50'$. The changes necessary consist of installing a modified telescope reflecting mirror assembly and a slight realignment of bar positions. No changes to system optical or logical functions will result.

II. SCANNING GEOMETRY

The scanning mechanism utilized in the system consists of a scanning mirror mounted in an azimuth-outside, elevation-inside gimbal as shown in Figure 1. Eighteen azimuth positions (bars) are swept vertically to produce one frame. A fixed telescope, mounted beneath the scanning mirror, is used to focus target irradiance upon a 100-pair detector array.

Due to the telescope being fixed in relation to the azimuth angles of the scanning mirror, the target irradiance sweeps the detector array at an angle equal to the azimuth mechanical angle. If the irradiance sweep is thought of as being vertical then the detector array appears to rotate at angles relative to the horizontal which are equal to the azimuth mechanical angles. This is shown in Figure 2.

The rotation of the array decreases the coverage of each bar as the mechanical angle increases.

To determine the 18 azimuth bar positions, two constraints must be considered, (1) each bar position must be located to assure that the space between detectors of one row is opposite a detector pair in the other row, and (2) sufficient overlap between bars exists so that any target within the field of view will sweep both rows of detector pairs. These constraints assure that all target points in the field will scan at least one detector pair.

The geometry which determines the nominal azimuth bar positions is shown in Figure 3. These angles and their ranges appear in Table 1. The double row overlap scan constraint is shown in Figure 4.

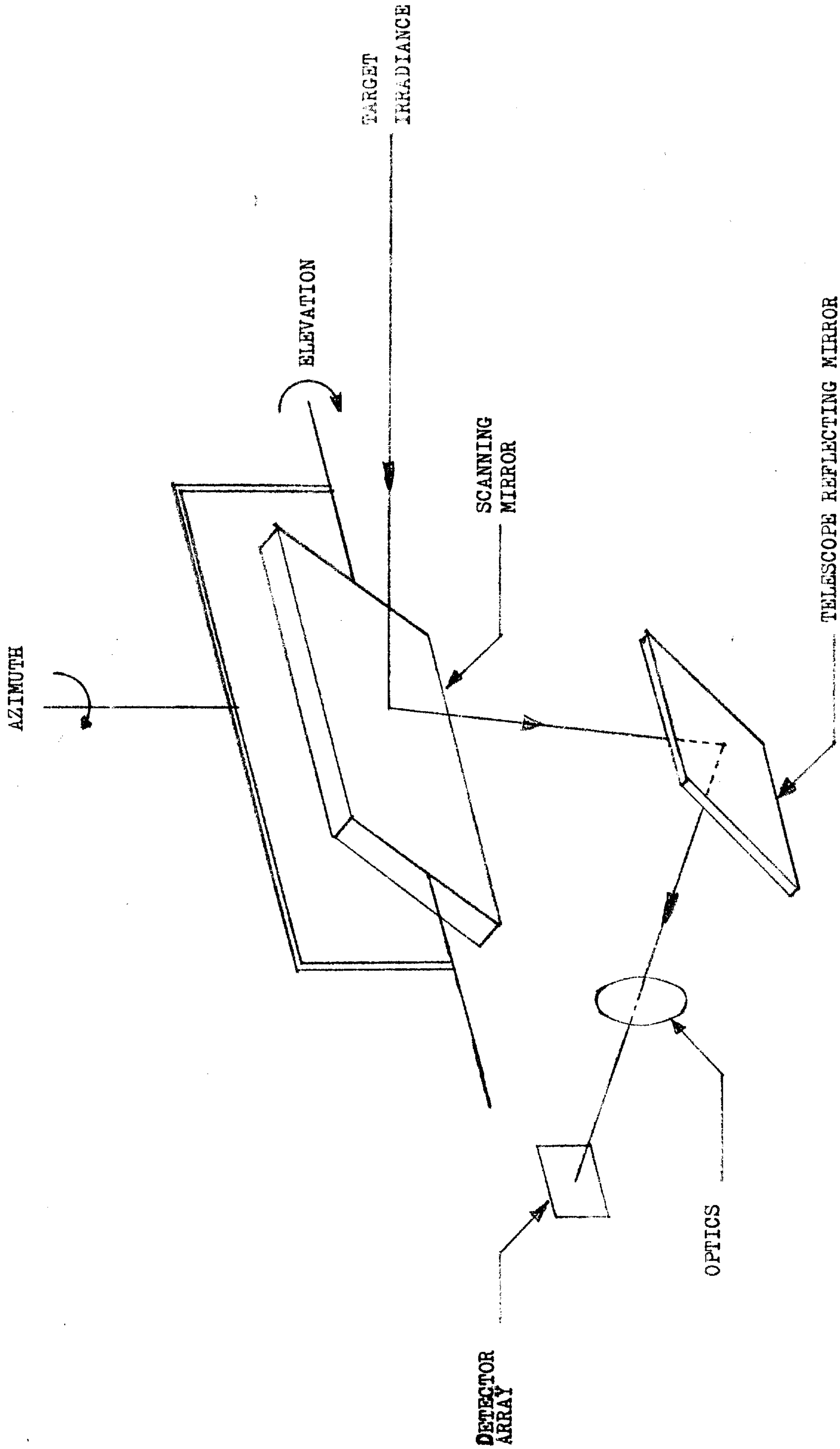


FIGURE 1 - SCANNING MECHANISM

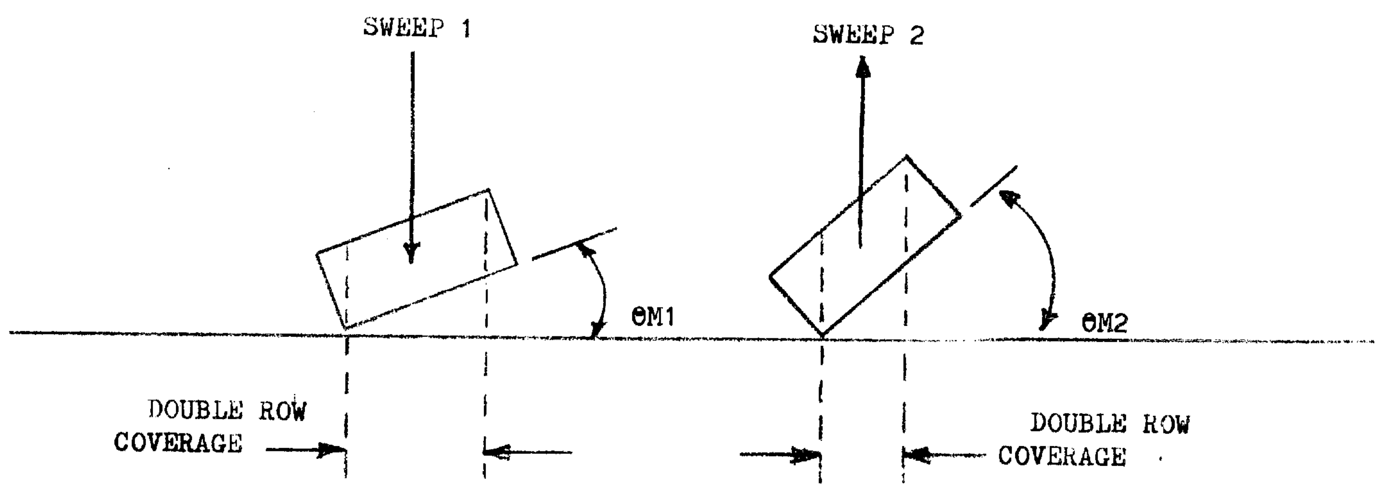
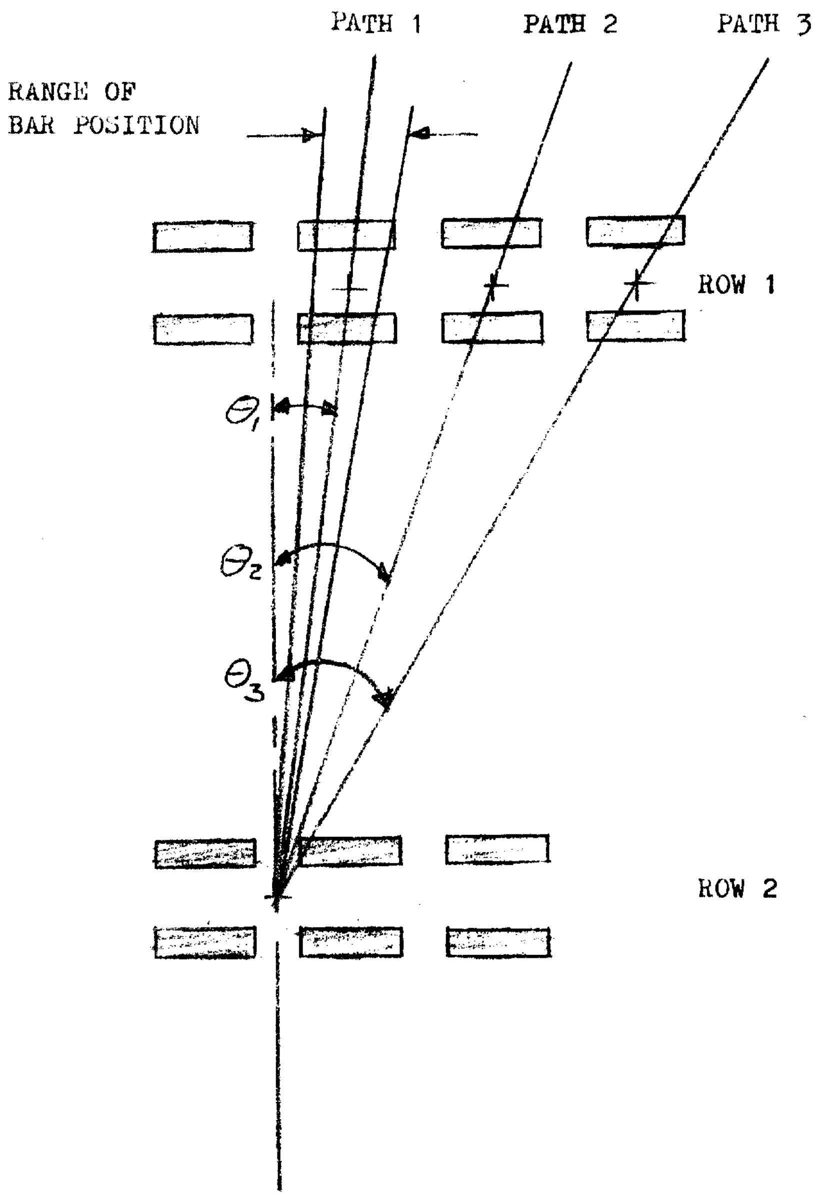


FIGURE 2 - ROTATION OF DETECTOR ARRAY AS A FUNCTION OF MECHANICAL AZIMUTH ANGLE.



NOTE: DETECTOR ELEMENTS NOT TO SCALE

FIGURE 3 - AZIMUTH BAR POSITIONS
AS A FUNCTION OF
DETECTOR SPACING.

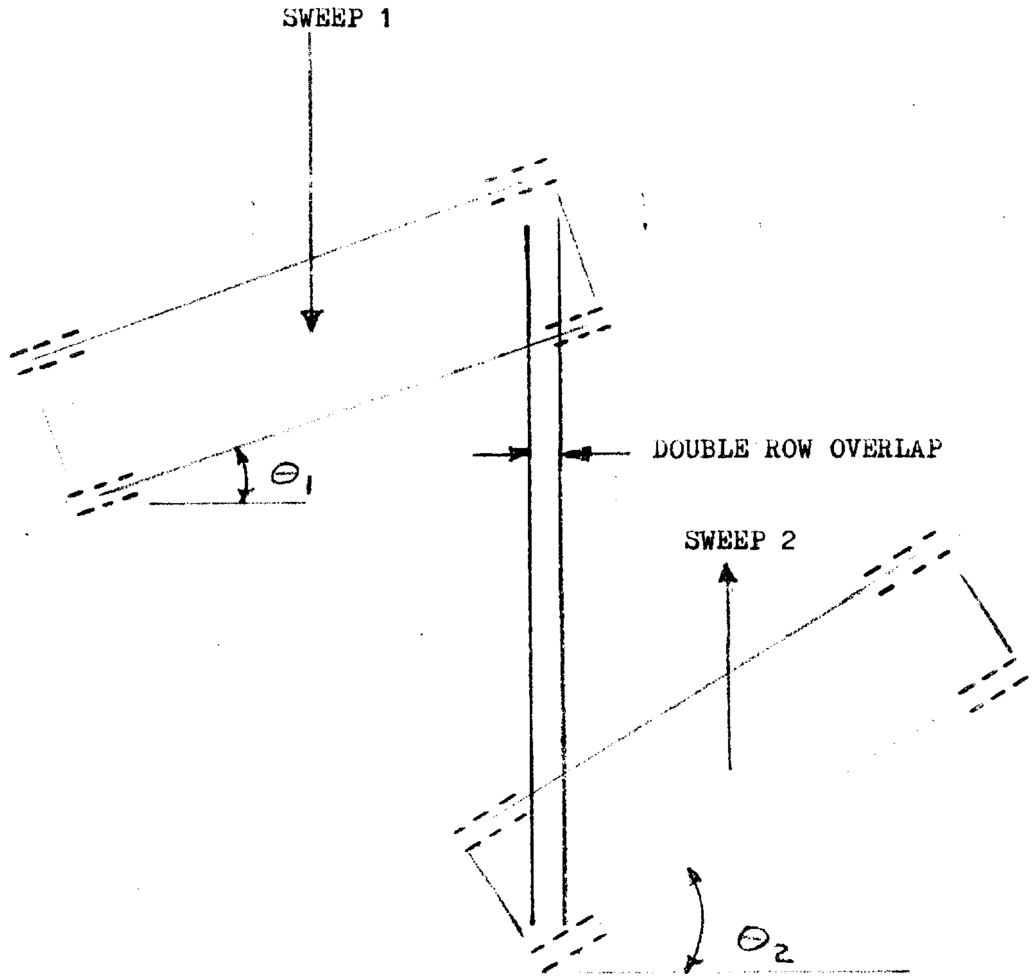


FIGURE 4 - DOUBLE ROW OVERLAP SCAN CONSTRAINT

BAR	NOMINAL MECHANICAL ANGLE	LIMITS MECHANICAL ANGLE	CURRENT MECHANICAL ANGLE	CURRENT LOOK ANGLE	CURRENT DOUBLE ROW LIMITS	CURRENT DOUBLE ROW OVERLAP
10-9	2° 36.5'	1° 39' 3° 34'	2° 37'	2° 23'	-0° 37' 5° 23'	1° 14'
11-8	7° 47'	6° 51' 8° 43'	7° 47'	7° 06'	4° 11' 10° 01'	1° 12'
12-7	12° 50'	11° 56' 13° 45'	12° 49'	11° 42'	8° 54' 14° 30'	1° 07'
13-6	17° 42'	16° 50' 18° 33'	17° 41'	16° 10'	13° 29' 18° 51'	1° 01'
14-5	22° 18.5'	21° 29' 23° 07'	22° 17'	20° 23'	17° 50' 22° 56'	1° 01'
15-4	26° 38'	25° 52' 27° 24'	26° 37'	24° 23'	21° 59' 26° 47'	57'
16-3	30° 39'	29° 56' 31° 21'	30° 36'	28° 03'	25° 47' 30° 19'	1° 00'
17-2	34° 22'	33° 42.5' 35° 00.5'	34° 23'	31° 34'	29° 27' 33° 41'	52'
18-1	37° 46'	37° 10' 38° 22'	37° 47'	34° 43'	32° 44' 36° 42'	57'

TABLE 1 - SCAN PATTERN ANGLES

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BAR	MODIFIED MECHANICAL ANGLE	MODIFIED LOOK ANGLE	MODIFIED DOUBLE ROW LIMITS	MODIFIED DOUBLE ROW OVERLAP
10-9	2° 36'	2° 51'	- 09' 5° 51'	18'
11-8	7° 44'	8° 28'	5° 51' 11° 23'	18'
12-7	12° 42'	13° 54'	11° 05' 16° 43'	18'
13-6	17° 27'	19° 06'	16° 25' 21° 47'	18'
14-5	22° 00'	24° 03'	21° 29' 26° 37'	18'
15-4	26° 18'	28° 44'	26° 19' 31° 09'	18'
16-3	30° 20'	33° 07'	30° 51' 35° 23'	18'
17-2	34° 07'	37° 12'	35° 05' 39° 19'	18'
18-1	37° 38'	41° 00'	39° 01' 42° 59'	18'

SINGLE ROW COVERAGE $\pm$ 43° 50'

TABLE 1 - (Continued)

The first constraint of locating detector pairs opposite spaces is satisfied by choosing mechanical azimuth angles which are within the ranges specified in Table 1. The second constraint of providing double row overlap becomes a function of the azimuth look angle which is related to the placement of the telescope reflecting mirror.

In the present system the telescope reflecting mirror is located 5° behind the vertical axis of the scanning mirror as shown in Figure 5. This causes an azimuth look angle of less than the azimuth mechanical angle according to the equations

$$\Theta_{LA} = \Theta_{MA} - 5 \sin \Theta_{MA}$$

where

Θ_{LA} is azimuth look angle

Θ_{MA} is the azimuth mechanical angle

The elevation look angle is affected by the telescope mirror position angle and the mechanical azimuth angle according to the equations

$$\Theta_{LE} = (2\,\Theta_{ME} + 5 \cos \Theta_{MA}) - 90$$

where

Θ_{LE} is the elevation look angle

Θ_{ME} is the mechanical angle

These equations describe the scanner look angles in a spherical coordinate system.

As shown in Table 1, the present system provides azimuth double row coverage of $\pm 36^{\circ}42'$, with single row coverage extended out to $37^{\circ}38'$. Since elevation coverage follows the spherical meridians the scan pattern converges at the poles. Total elevation coverage is $+29.5^{\circ}$ to -34.5° relative to the scanner axis.

III. INCREASED FIELD OF VIEW

A study was conducted to determine the feasibility of increasing the azimuth coverage to $+45^{\circ}$. The same two constraints of azimuth mechanical angle and double row overlap were maintained to assure that any target within

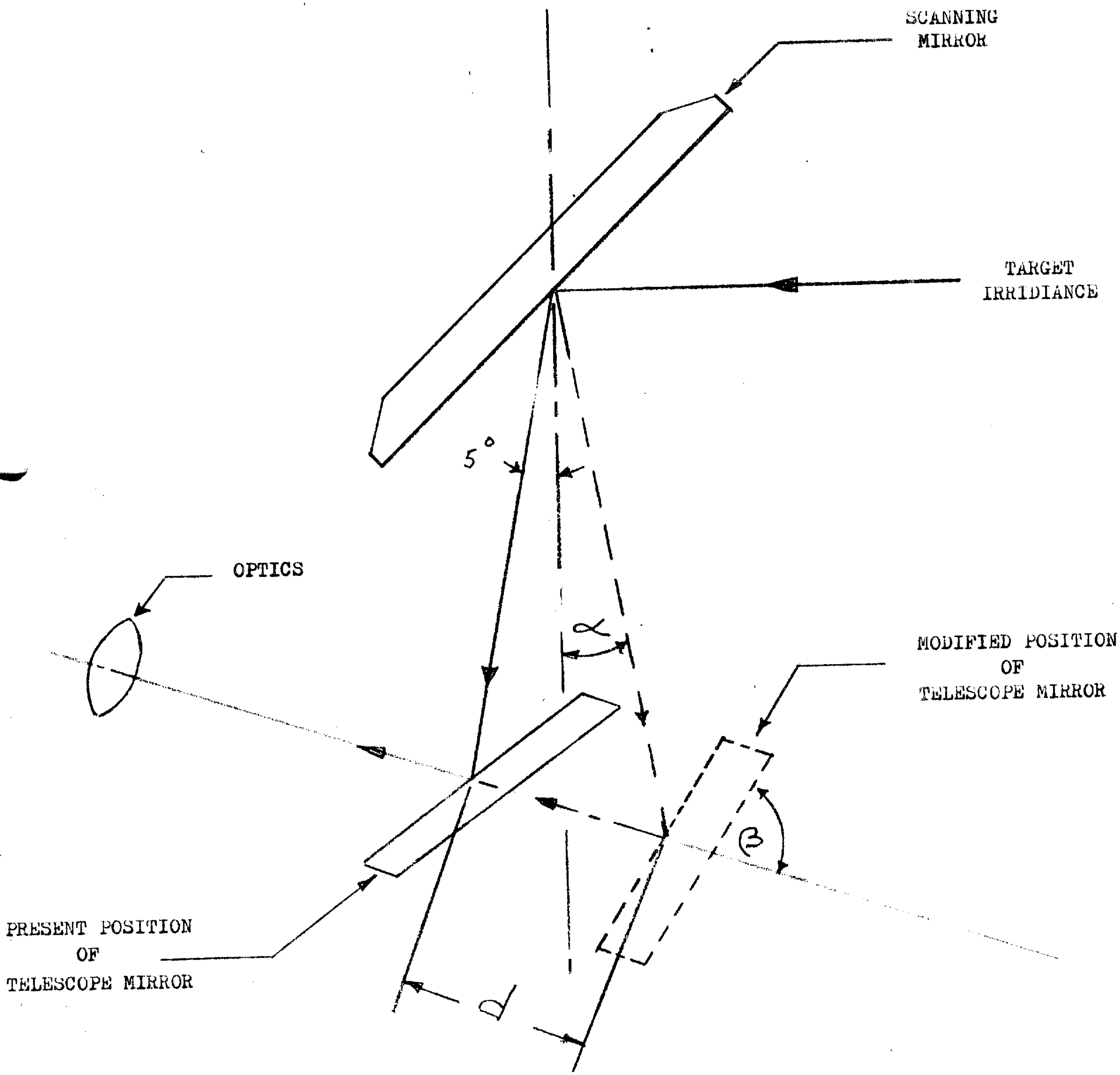

FIGURE 5 - PRESENT AND MODIFIED OPTICAL SYSTEMS

the field of view would scan at least one detector pair.

To increase the azimuth coverage more bar positions could have been added, but a limit would soon be reached since additional bars would mean additional detector rotation and decreased coverage per bar. (Considerable changes to the system electronics would also be required. Additional bars would require a longer frame time which would demand changes in the system logic timers.)

A review of the scan pattern equations reveals that the azimuth look angles can be increased by repositioning the telescope reflecting mirror in front of the vertical axis of the scanning mirror. The azimuth look angle equation changes from

$$\theta_{LA} = \theta_{MA} - 5 \sin \theta_{MA}$$

to

$$\theta_{LA} = \theta_{MA} + \alpha \sin \theta_{MA}$$

where α is the offset angle in front of the vertical axis of the scanning mirror as shown in Figure 5.

Thus the look angle becomes greater than the mechanical angle by a factor of $\alpha \sin \theta_{MA}$ and the field of view can be increased without additional bar positions.

Since the azimuth mechanical angles are relatively fixed due to detector configuration, an optimum offset angle α was sought to provide sufficient double row overlap. The overlap could have been reduced to zero but this would allow no drifting of the scanner bar positions due to environmental conditions or aging of the systems. A laboratory test was conducted to determine the amount of scanner drift on a stabilized system. Maximum drift was measured to be 6 minutes of arc.

An overlap of $0^{\circ}18'$ was selected since in the worst case drift of bar positions $0^{\circ}12'$ of overlap could be lost, leaving $0^{\circ}06'$ of overlap to satisfy the double row scan constraint.

α was selected as $5^{\circ}30'$ and azimuth mechanical angles were adjusted slightly to predict a scan pattern of $\pm 42^{\circ}59'$ of double-row azimuth scan extending out to $\pm 43^{\circ}50'$ of single row scan. The azimuth look angle equation changed to

$$\Theta_{LA} = \Theta_{MA} + 5.5 \sin \Theta_{MA}$$

The elevation look angle equation changed to

$$\Theta_{LE} = \left(2\ \Theta_{ME} - 5.5 \cos \Theta_{MA}\right) - 90$$

For an offset angle α of $+5^{\circ}30'$ the telescope reflecting mirror had to be moved a distance δ of 0.578 inches down the axis and tilted to an angle β of $53^{\circ}15'$ with respect to the axis.

Figure 6 shows the scan pattern of the modified optical system along with the pattern of the present system displayed on a spherical coordinate system.

The entire modified pattern is shifted down $10^{\circ}30'$ from the original pattern due to the change in offset angle of the telescope reflecting mirror.

Since the optical path within the system dome is increased 0.578 inches by moving the telescope mirror, effects on focal length and target image quality at the detector array must be considered. Laboratory tests were run, and proved these effects negligible.

Since overlap between bars would be reduced from about 1° in the present system to $0^{\circ}18'$ in the modified system, the overlap inhibit function of the logic, which prevents one target from appearing as two when located in the overlap region, will be modified.* This is easily accomplished by removal of input diodes on the 401 and 402 cards.

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* The present overlap inhibit takes 11 detector elements from each row at one end of the detector (38 through 49 and 88 through 99) and sums their outputs into a gate. If a target is detected, the gate is set to produce an inhibit if the target appears in the overlap region of the summed channels on the following scan. If no target appears in the overlap region the gate is reset to its initial condition by the following limit pulse.

The 11 detectors represent about 1° of the field of view of the bar. Since the proposed bar overlap is reduced to $0^{\circ}18'$ the summed input will be reduced from 11 to 3 detectors in each row.

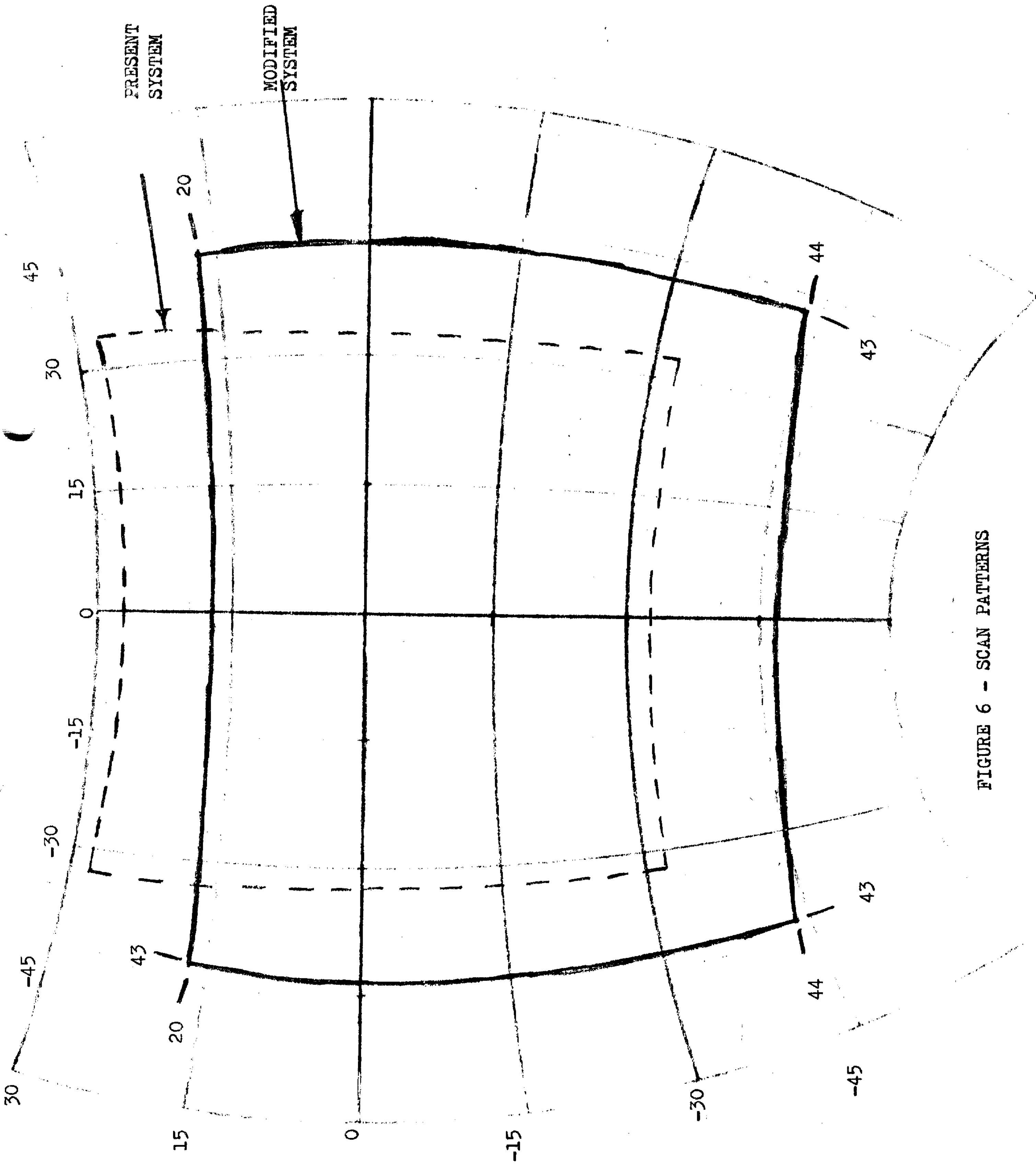

FIGURE 6 - SCAN PATTERNS

IV. RESULTS OF LABORATORY TESTS

A mirror assembly was fabricated which provided the 5°30' offset angle and was used with an available system for lab testing.

TEST 1. - TARGET DEGRADATION

To determine effects of extending the path length of the optical system within the dome a non-modified system was used. A blackbody temperature of 1000°C and aperture of .0081 inches was used with a collimator to produce a very sharp image. One detector output was monitored and the response of the image was mapped across the detector with the dome in its normal position. The dome was then moved out to increase the path length by one inch and then two inches with the target response mapped at these locations. Any target degradation would appear as a decrease-in-amplitude response curve. The results of this test are shown in Figure 7. As can be seen from the graph there was an amplitude reduction of about 6.5% for the two-inch path increase, and a reduction of 2-1/2% for the one-inch path increase. Since the modified system had a path increase of only 0.578 inches a response degradation of about 1% was expected. The degradation in response amplitude for the modified system proved immeasurable.

A broadening of the response curves did not occur as each curve shows a spread of about 5.2 minutes of arc at the -3db points.

System focus was checked in a similar manner. The focal point was found for dome distances of 0, 1, and 2 inches. A collimator focal change of three inches was required to refocus the system for the two-inch dome displacement.

Using the formula

$$Xt = Xc\left(\frac{f_t}{f_c}\right)^2$$

where Xt is the error in the telescope focal length

Xc is the error in the collimator focal length

f_t is the telescope focal length

and f_c is the collimator focal length

the error in focal length was 1.055 thousandth of an inch for a dome displacement of two inches. Since the modified system had a path increase of 0.578 and the smallest adjustment shim available was 1 thousandth of an inch, no refocusing of the modified system telescope was attempted. A focus test on the modified system showed an adjustment shim of 0.3 thousandth of an inch would have been required.

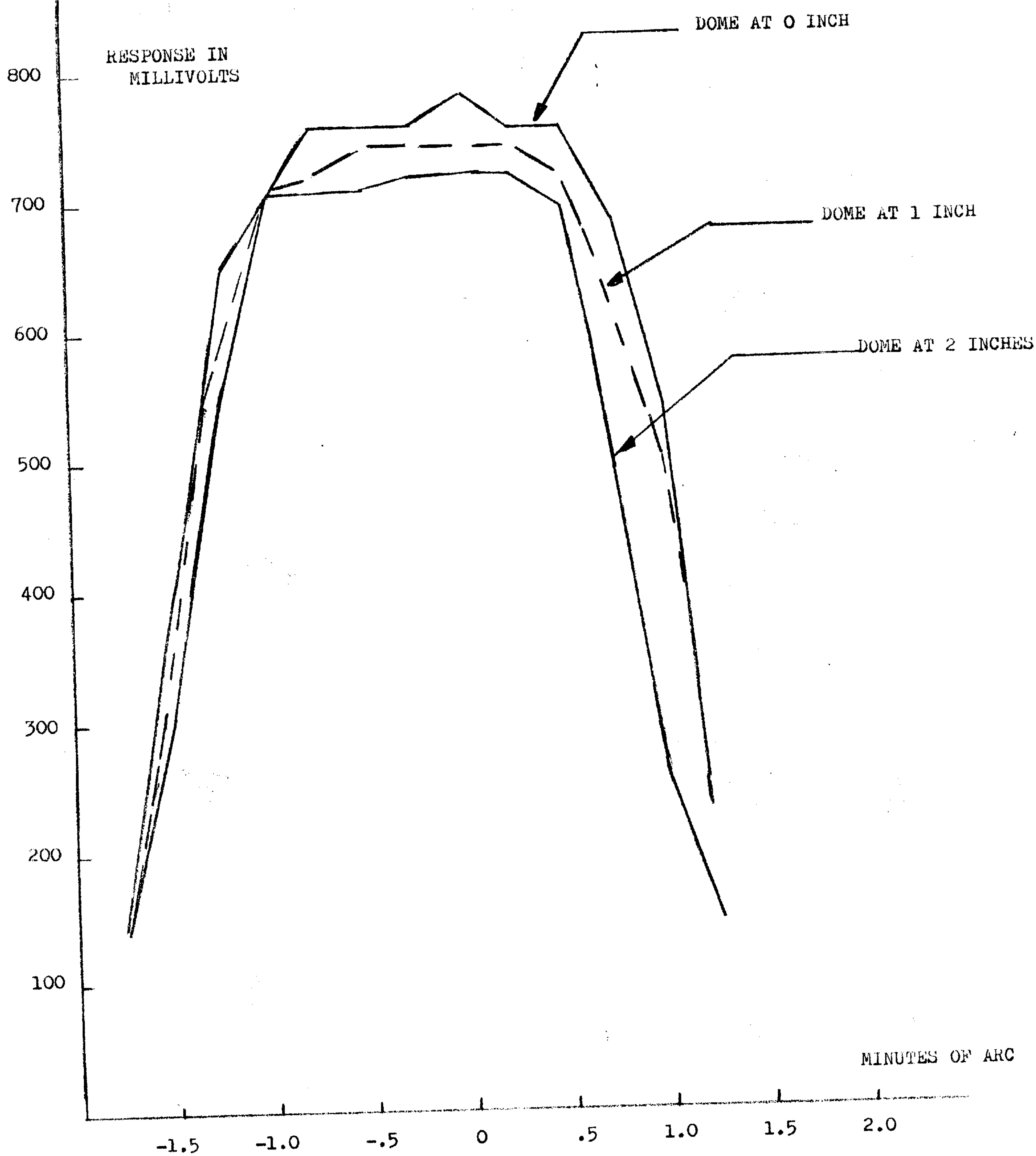

FIGURE 7 - DETECTOR RESPONSE AT INCREASED PATH LENGTHS.

V. TEST 2. - FIELD MAPPING

A modified mirror assembly was mounted into an operating system and the azimuth field was mapped at 0° elevation using a blackbody source and rotary table. Double row overlap coverage was measured at $42^{\circ}38'$ with single row coverage extended out to $43^{\circ}34'$. Since these numbers do not exactly match the predicted values of double row coverage of $42^{\circ}59'$, and single row extension of $43^{\circ}50'$, an alignment error in the mirror assembly was suspected. A new and more rigid mirror assembly was designed, but as yet has not completed fabrication for testing. The test did confirm the design equation for the azimuth look angle, $\Theta_{LA} = \Theta_{MA} + \alpha \sin \Theta_{MA}$, in that the look angle exceeded the mechanical angle by a factor of $\alpha \sin \Theta_{M}$.

To confirm the elevation look angle equation,

$$\Theta_{LE} = (2\ \Theta_{ME} - \alpha \cos \Theta_{MA}) - 90,$$

a projector was constructed to replace the telescope in the scanner head. A reticule was projected to confirm the upward motion of the elevation look angle with an increased azimuth mechanical angle. The elevation look angle did follow the $-\alpha \cos \Theta_{MA}$ relationship.

TEST 3. - SCANNER STABILITY

Since it is proposed to reduce the double row overlap from the present values of about 1 degree down to $0^{\circ}18'$ a test was made to determine if the scanner bar alignment could be held to such tolerances.

The test consisted of allowing a system to stabilize with the card file temperature at 100°F, (normal operating temperature), and then monitoring the detector array output to determine drift. The target source consisted of a collimated blackbody source of 1000°C with an aperture of .0081 to produce a sharp image. The system was monitored for 3 hours and maximum measurable drift was $+0^{\circ}06'$. Since the above test can only be considered short term data, stability data from the field was obtained on two systems which had been in operation for about three months without requiring adjustments to the scanner. The average bar drift for the two systems was $0^{\circ}02.7'$, the maximum drift was $0^{\circ}07'$. This is well within the $0^{\circ}18'$ double row overlap region.

V. CONCLUSIONS

All laboratory tests confirmed the feasibility of increasing the field of view from the present double row coverage of $\pm 36^{\circ}42'$ to $\pm 42^{\circ}59'$, with single row coverage extended from $37^{\circ}38'$ to $43^{\circ}50'$. Double row overlap of $0^{\circ}18'$ would be provided between bars. Scanner stability has proven adequate to justify the reduced overlap.

The changes required to implement the increased field are (1) installation of a telescope mirror assembly which moves the mirror 0.578 inches down the telescope axis and tilts the mirror to an angle of $53^{\circ}15'$ to the axis, (2) a slight realignment of bar positions, (3) installation of new bar position index plate, (4) removal of diodes on the 401 and 402 Logic Cards to modify the overlap inhibit logic and (5) installation of a new vignette mask.

The elevation scan pattern is shifted down $10^{\circ}30'$ of the telescope mirror. However, the elevation field of view of the system is determined by the dome mask which causes 50% obscuration at $\pm 15^{\circ}$ (relative to the pod). The downward shift of the scan pattern therefore has no significant effect upon the elevation coverage of the system.

No significant change to the system optical characteristics or logic functions would be affected by these changes.

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CJC:70004

TECHNICAL MANUAL REVISION

STATEMENT OF WORK

1. It is proposed that the technical manual be revised utilizing as much of the original art and text as possible. In addition to changing the F.O.V., where referenced, description and procedure for use of the collimator, dessicant dryer and telescope purge system will be added. New illustrations will be added for the scanner, telescope, telescope purge system, collimator and dessicant dryer as required to support description and operation text. Schematic diagrams will be updated to reflect latest changes in wiring of all assemblies. Technical manual will be reproduced and issued as Revision 1.

2. Tasks - Update Text.

(1) Analysis of information in handbook and comparison with latest data.

(2) Expand maintenance section to include check out using collimator and other added equipment.

(3) Identification and use of new AGE.

(4) Incorporate telescope purge change.

(5) Update F.O.V. parameter wherever mentioned. Sections 1, 2, and 3.

3. Update Illustrations

(1) New photographs as required.

(2) New line art as required.

4. Retype Text.

5. Reproduce - 30 copies.

CJC:70004

COST BREAKDOWN

Material				
Printing		$2,000		
Total Materials			$2,000	
Material Burden @ 11%			220	
Total Material Including Burden				$2,220
	Hours	Rate/Hour $	Amount $	
R&D POOL (Engineering)				
Salaried	250	7.37	1,843	
Hourly	200	4.55	910	
Total R&D Direct Labor				2,753
Direct Labor Overhead @ 135%				3,717
Total Direct Costs Including Overhead				8,690
General and Administrative Expense @ 14.8%				1,286
Total Estimated Cost				9,976
Fixed Fee				800
Total Estimated Cost Including Fixed Fee				$10,776

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[redacted] HAS RECOMMENDED A SYSTEM 20 TECH MANUAL REVISION PER REF. THE FOLLOWING DATA IS BEING SUPPLIED UNTIL THIS REVISION IS FINALIZED: 25X1

A. THE TELESCOPE ASSEMBLY SHALL BE PURGED WITH DRY GASEOUS NITROGEN FOR AT LEAST 1/4 HOUR PRIOR TO ANY UTILIZATION THAT REQUIRES THE SYSTEM BEING SUBJECTED TO PRESSURE CHANGES OR COOLING.

B. PRIOR TO EACH UTILIZATION, THE SYSTEM SHALL BE PURGED WITH THE J-218 GROUND CHECKOUT CART FOR A PERIOD OF 1 HOUR. FOLLOWED BY 1 HOUR OF DRY GASEOUS NITROGEN.

C. IF STEP "B" IS ACCOMPLISHED MORE THAN 8 HOURS PRIOR TO ACTUAL USE OF THE SYSTEM, AN ADDITIONAL 1/2 HOUR OF DRY GASEOUS NITROGEN SHALL BE PROVIDED WITHIN THE LAST 4 HOURS.

D. UPON RECOVERY FROM AN UTILIZATION, A DRY GASEOUS NITROGEN PURGE SHALL BE SUPPLIED TO THE SYSTEM FOR A PERIOD OF 1 HOUR, AND TO

COORDINATING OFFICERS

RELEASING OFFICER

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257

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THE TELESCOPE FOR A PERIOD OF 1/2 HOUR. SINCE THE SYSTEM MAY REMAIN AT A LOWERED TEMPERATURE FOR A PERIOD OF TIME, CARE SHOULD BE EXERCISED TO PREVENT AMBIENT ATMOSPHERE FROM ENTERING THE SYSTEM OR TELESCOPE AND RESULTING IN CONDENSATION.

PENDING THE MODIFICATION FOR PURGING THE TELESCOPE, THE SYSTEM SHALL BE ALLOWED TO WARM SUFFICIENTLY PRIOR TO REMOVING THE DOME.

E. THE SYSTEMS SHALL BE STORED IN THEIR SEALED SHIPPING CONTAINER WHEN NOT IN USE. PRIOR TO SEALING, THE CONTAINER SHALL BE SUPPLIED WITH ADEQUATE DESICCANTS AND/OR PURGED WITH DRY GASEOUS NITROGEN.

F. THE TELESCOPE ASSEMBLY SHALL BE PURGED WITH DRY GASEOUS NITROGEN FOR A PERIOD OF 1/2 HOUR AT LEAST ONCE A WEEK UNLESS THE SYSTEM IS IN A CONTROLLED ENVIRONMENT STORAGE, THEN THE PURGING SHALL BE DONE UPON REMOVAL OF THE SYSTEM FROM THE STORAGE FACILITY.

G. THE SYSTEM SHALL BE PURGED WITH DRY GASEOUS NITROGEN FOR A PERIOD OF 1 HOUR AT LEAST ONCE A WEEK UNLESS THE SYSTEM IS IN A CONTROLLED ENVIRONMENT STORAGE FACILITY.

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257

TO INFO CITE 9616

H. EXTREME CAUTION SHALL BE EXERCISED WHEN THE SYSTEMS ARE DEPLOYED TO A DAMP CLIMATE.

I. THE DETECTOR IMPEDANCE OF SELECTED CHANNELS SHALL BE MONITORED ON A PERIODIC BASIS SO AS TO INDICATE ANY MOISTURE IN THE ARRAY. THE CHANNELS SELECTED SHALL NOT INCLUDE ANY END CHANNEL, ANY CHANNEL ADJACENT TO A NON-OPERATING CHANNEL, NOR ANY TWO ADJACENT CHANNELS. THE IMPEDANCE MEASUREMENTS SHALL BE DONE ONLY WITH THE PROPER EQUIPMENT, AS THE DETECTORS ARE EASILY DESTROYED OR DAMAGED.

J. SYSTEM TRIGGER LEVEL SHALL BE MEASURED BY A FACTORY AUTHORIZED TECHNICIAN ON A PERIODIC BASIS USING A BLACK BODY AND COLLIMATOR.

K. UTILIZE PERSONNEL GROUND STRAP GROUNDED TO SYSTEM WHEN INSTALLING OR REMOVING PREAMPS AND WHEN TESTING DETECTOR IMPEDANCE TO AVOID POSSIBILITY OF STATIC DISCHARGE DAMAGING DETECTOR ELEMENTS.

END OF MESSAGE

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1	D/M	9	
2	D/M	10	
3	D/M	11	
4	D/M	12	
5	D/SA	13	
6	CMD	14	
7	RB	15	
8		16	

PRECEDENCE	DEFERRED	PRIORITY	INITIALS
	ROUTINE	OPERATIONAL IMMEDIATE	INITIALS

TO :

FROM: 362

CONF:

INFO: 15 DEC 69 22

665

TO SECRET INFO CITE [redacted] 25X1 9071 25X1

[redacted]

IDEALIST DM-4

REF: [redacted] PROPOSAL CJC: 69026 25X1

1. REQUEST YOU ISSUE A WORK ORDER UNDER CONTRACT AG-1103 TO COVER SCOPE OF WORK OUTLINED IN REF.

2. EXPENDITURES ARE NOT TO EXCEED $5,531.00 INCLUDING FIXED FEE.

END OF MESSAGE

25X1

COORD: CMD [redacted]

[redacted] 25X1

D/M/OSA

RELEASING OFFICER

COORDINATING OFFICERS

SECRET

GROUP 1 Excluded from automatic downgrading and declassification

AUTHENTICATING OFFICER

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